

Household Emergency Preparedness

Results from the Montana Behavioral Risk Factor Surveillance System (BRFSS), 2012

INTRODUCTION

A large-scale disaster or emergency is an event that leaves individuals isolated in their homes or displaced from their homes for at least three days.^{1,2} The Centers for Disease Control and Prevention (CDC) developed a standardized general household preparedness module for the Behavioral Risk Surveillance System (BRFSS) in 2006.⁵ Montana administered the 11-question module in 2012. The purpose of this report is to examine the association between emergency preparedness, demographic characteristics, and health status to help public health officials develop strategies to improve outreach and training.

METHODS

BRFSS is an anonymous, random-dialed telephone survey that uses probability samples of non-institutionalized adults with landline or cell telephone service to obtain self-reported information on health status, behaviors, and knowledge.⁶ The general preparedness module includes one question assessing subjective level of household preparedness, five questions assessing objective measures of preparedness, two questions about how individuals would communicate and receive information during a disaster, and three questions about evacuation preparedness and anticipated behavior during an evacuation (Sidebar). The full questionnaire can be found on our website.⁷

We assessed the prevalence of three preparedness domains:

- Having all four essential household supplies (water, food, radio and batteries, and flashlight and batteries);
- Having a written emergency evacuation plan for the household in the event of a large-scale disaster;
- Having a three-day supply of prescription medications for each person in the household who takes them; respondents in households in which no one was taking prescribed medications (n=1147) were excluded from the analysis for this variable.

General Preparedness Module

Subjective Preparedness Item:

1. **Level of Preparedness:** How well prepared do you feel your household is to handle a large-scale disaster or emergency? Would you say: well, somewhat, or not at all?

Objective Preparedness Items:

2. **Water Supply:** Does your household have a 3-day supply of water for everyone who lives there? (1-gallon per person per day)
3. **Food Supply:** Does your household have a 3-day supply of nonperishable food for everyone who lives there? (Food that does not require refrigeration or cooking)
4. **Medication Supply:** Does your household have a 3-day supply of prescription medication for each person who takes prescription medications?
5. **Battery-operated radio:** Does your household have a working battery operated radio and working batteries for your use if the electricity is out?
6. **Flashlight with batteries:** Does your household have a working flashlight and working batteries for your use if the electricity is out?

Communication Items:

7. **Communication with family:** In a large-scale disaster, what would be your main method or way of communicating with relatives and friends?
8. **Communication with authorities:** What would be your main method or way of getting information from authorities in a large-scale disaster or emergency?

Evacuation Anticipated Behavior Items:

9. **Written Evacuation Plan:** Does your household have a written disaster evacuation plan for how you will leave your home, in case of a large-scale disaster or emergency that requires evacuation?
10. **Mandatory Evacuation Compliance:** If public authorities announced a mandatory evacuation from your community due to a large-scale disaster or emergency, would you evacuate?
11. **Reason if non-compliance:** What would be the main reason you might not evacuate if asked to do so?



We compared preparedness status across a variety of demographic and health status variables. Vulnerable populations such as individuals with chronic health conditions or disabilities may be at greater than average risk during large-scale disasters or emergencies.^{3,4} We defined three categories of vulnerability:

- Poor physical health or disability: physical health limitations based on any combination of self-rated health status fair or poor; multiple days of poor physical health in the month before the interview; limitation of daily activities due to poor physical or mental health; visual impairment or blindness; or reliance on special equipment such as cane, wheelchair, special bed, or special telephone;
- Diagnosed chronic conditions: physical illnesses including diabetes, coronary heart disease, asthma, COPD, kidney disease, arthritis, prior heart attack, prior stroke (none, one, or two or more); and
- Poor mental health: mental health limitations including multiple days of poor mental health in the month before the interview or diagnosed with a depressive disorder.

Respondents could be in more than one of these categories.

STATISTICAL ANALYSIS: We used SAS PROC SURVEYFREQ to describe the prevalence of sample characteristics and preparedness variables and to test bivariate associations between them. Associations were tested by chi square or by test-for-trend for three-category ordinal variables. Sample sizes vary slightly due to sporadic missing values for variables. Respondents were included in an analysis if they had complete data for all variables.

RESULTS

A total of 8,679 Montana adults were interviewed in 2012. A substantial proportion of respondents reported aspects of poor physical or mental health (Table 1). More than half reported some aspect of poor physical health or a disability, one quarter reported having one diagnosed chronic disease and 14% reported having two or more; and 41% reported having poor mental health or diagnosed depression.

More than a quarter of respondents assessed their households as well prepared for an emergency and more than half rated their households as somewhat prepared (Table 2). However, only one third of respondents met all four objective criteria of having adequate water, food, radios, flashlights, and batteries. Notably, only half had adequate water supplies. Only 16% of households had written emergency evacuation plans. Nearly 90% of households with residents requiring prescription medications had at least a three-day supply on hand.

More men than women reported their households met all four objective criteria, and fewer respondents age 18 to 34 years reported their households met all four (Table 3). More respondents with diagnosed chronic diseases reported having all four household items than those without chronic diseases. More respondents without poor mental or diagnosed depressive disorders reported having all household items. Race, education, income, and poor physical health or disability were not associated with significant variation in having all four household items.

	Wt. %	95% CI		Unwt. N
		LL	UL	
Sex				
Male	49.8	48.4	51.2	3,786
Female	50.2	48.8	51.6	4,893
Age Group				
18-34	28.4	27.0	29.7	1,408
35-54	51.0	49.6	52.4	4,394
55 and older	20.6	19.7	21.5	2,829
Race				
White, non-Hispanic	89.6	88.7	90.5	7,575
American Indian	5.2	4.6	5.8	594
All other	5.2	4.5	5.9	420
Education				
High school graduate or less	40.5	39.2	41.9	3,378
Post high school	34.0	32.7	35.4	2,512
College degree +	25.4	24.3	26.5	2,767
Household Income				
< \$25,000	32.3	30.9	33.7	2,652
\$25,000-\$49,999	30.5	29.2	31.9	2,362
\$50,000 or more	37.2	35.8	38.6	2,720
Poor Physical Health or Disability				
Yes	53.5	52.1	54.9	4,791
No	46.5	45.1	47.9	3,765
Diagnosed Chronic Conditions				
None	60.1	58.7	61.4	4,448
1	25.7	24.5	26.9	2,409
2 or more	14.3	13.4	15.2	1,533
Poor Mental Health				
Yes	40.6	39.2	41.9	3,295
No	59.5	58.1	60.8	5,266

Table 2. Preparedness Assessment				
Self-Assessment of Preparedness	Wt. %	95% CI		Unwt. N
		LL	UL	
Well prepared	26.6	25.4	27.9	2,205
Somewhat prepared	53.7	52.3	55.2	4,419
Not prepared	19.7	18.5	20.8	1,491
Have 3 days of water				
Yes	53.7	52.2	55.1	4,573
No	46.3	44.9	47.8	3,511
Have 3 days of food				
Yes	85.7	84.6	86.7	7,026
No	14.3	13.3	15.4	1,051
Have radio and batteries				
Yes	69.4	68.1	70.8	5,468
No	30.6	29.2	31.9	2,573
Have flashlight and batteries				
Yes	96.2	95.6	96.8	7,814
No	3.8	3.3	4.4	320
Have all four household items				
Yes	33.7	32.4	35.0	3,069
No	66.3	65.0	67.6	5,610
Have written evacuation plan				
Yes	15.5	14.3	16.4	1,257
No	84.7	83.6	85.7	6,798
Have 3 days of prescription medications*				
Yes	89.8	88.7	90.8	6,397
No	10.2	9.2	11.3	575
* Households with residents taking medication regularly.				

Very few respondents reported having written evacuation plans. More women than men reported having plans. The prevalence of plans increased with age, but decreased with education and income. More respondents with poor physical health had evacuation plans and having evaluation plans increased with the number of diagnosed chronic diseases. Poor mental health was not associated with variation in having a written evacuation plan.

Having at least a three-day supply of prescription medications for members who required them varied significantly by age group, race, education, and income. Having medications on hand increased with the number of diagnosed chronic diseases, and was lower among respondents with poor mental health or depression than among those without. Having medications on hand did not differ between respondents reporting generally poor physical health or disability and those who did not.

DISCUSSION

The majority of respondents to Montana's 2012 BRFSS survey were not well-prepared for emergencies. Most households had food on hand and flashlights were nearly ubiquitous, but only half of all households reported having a three-day supply of drinking water for every resident, and only one third reported having all four essential items (adequate food, water, radios, flashlights,

and batteries). Only 15% reported having a written emergency evacuation plan. In contrast, 90% reported having at least a three-day supply of prescription medications for residents who needed them. Most people who regularly take medication usually fill their

Table 3. Preparedness by Selected Demographic Characteristics																
		Household Items					Evacuation Plan					Medications				
		95% CI					95% CI					95% CI				
Sex		Wt. %	LL	UL	Unwt. N	P	Wt. %	LL	UL	Unwt. N	P	Wt. %	LL	UL	Unwt. N	P
	Male	38.1	36.1	40.0	3,786	0.001†	14.2	12.7	15.7	3,486	0.05†	88.8	87.2	90.5	2,963	NS†
	Female	29.4	27.7	31.0	4,893		16.4	15.0	17.9	4,569		90.7	89.3	92.0	4,009	
Age group, years																
	18-34	26.2	23.4	28.9	1,408	0.001‡	13.6	11.2	16.0	1,272	0.05‡	76	71.2	82.4	960	0.001‡
	35-54	36.3	34.5	38.1	4,394		15.2	13.8	16.6	4,153		91.8	90.6	93.0	3,544	
	55 and older	37.1	34.8	39.4	2,829		17.6	15.7	19.5	2,590		96.8	95.9	97.6	2,438	
Race																
	White, non-Hispanic	33.6	32.3	35.0	7,575	NS†	14.6	13.5	15.6	7,059	0.01†	91.5	90.5	92.5	6,095	0.001†
	American Indian	35.7	29.7	41.7	594		23.1	17.3	28.9	534		75.2	68.5	81.9	491	
	All other	32.9	26.4	39.4	420		19.4	13.6	25.2	388		75.1	67.1	83.0	323	
Education																
	High school graduate or less	34.5	32.3	36.6	3,378	NS‡	18.2	16.3	20.1	3,074	0.001‡	85.8	83.9	87.8	2,714	0.001‡
	Some college	33.8	31.4	36.2	2,512		15.8	13.8	17.7	2,344		90.8	89.0	92.6	2,020	
	College degree +	32.2	30.0	34.3	2,767		10.4	9.0	11.7	2,322		94.9	93.6	96.1	2,222	
House Income per Year																
	< \$25,000	32.8	30.6	35.3	2,652	NS‡	20.0	17.8	22.3	2,434	0.001‡	83.8	81.4	86.3	2,143	0.001‡
	\$25,000-\$49,999	33.6	31.1	36.0	2,362		15.5	13.5	17.6	2,212		91.2	89.4	93.0	1,881	
	\$50,000 or more	34.8	32.6	37.1	2,720		10.2	8.7	11.3	2,588		94.5	93.2	95.9	2,230	
Poor Physical Health or Disability																
	Yes	33.7	32.0	35.5	4,791	NS†	17.5	15.9	19.0	4,457	0.001†	90.1	88.8	91.5	4,064	NS†
	No	33.9	32.0	35.9	3,765		12.9	11.4	14.5	3,519		89.6	87.9	91.2	2,837	
Diagnosed Chronic Conditions																
	None	32.0	30.3	33.7	4,448	0.01‡	13.8	12.4	15.2	4,135	0.001‡	87.7	86.1	89.2	3,244	0.001‡
	1	35.9	33.3	38.4	2,409		16.6	14.4	18.7	2,240		91.1	89.1	93.1	2,068	
	2 or more	38.1	34.7	41.4	1,533		19.3	16.6	22.1	1,429		94.4	92.4	96.4	1,415	
Poor Mental Health or Diagnosed Depression																
	Yes	29.0	26.9	31.0	3,295	0.001†	15.5	13.8	17.2	3,094	NS†	88.0	86.2	89.7	2,780	0.01†
	No	36.7	35.0	38.4	5,266		14.9	13.6	16.3	4,859		91.2	89.9	92.5	4,095	
† Chi-square test; ‡ Test-for-trend																

† Chi-square test; ‡ Test-for-trend

prescriptions in 30-day or 90-day increments although having adequate medications on hand was less prevalent among respondents with lower educational attainment and lower income, suggesting there may be some barriers associated with cost. Many respondents reported aspects of poor physical or mental health that might make them unusually vulnerable in the case of an emergency. Poor physical health was associated with higher prevalence of having written evacuation plans and with having adequate supplies of prescription medications on hand. Poor mental health and diagnosed depression were associated with lower prevalence of household preparedness.

Background: *The Montana Behavioral Risk Factor Surveillance System (BRFSS) has been collecting state-specific, population-based estimates of health-related data since 1984. The purpose of this statewide telephone survey of Montana residents aged 18 and older is to gather information regarding personal health risk behaviors, selected medical conditions, and the prevalence of preventive health care practices among Montana adults. A full set of Montana yearly questionnaires and health indicators can be found on the Department of Public Health and Human Services (DPHHS) BRFSS database query system website at www.brfss.mt.gov.*

Survey Limitations: *The BRFSS relies on self-reported data. This type of survey has certain limitations: many times, respondents have the tendency to underreport some behaviors that may be considered socially unacceptable (e.g., smoking, heavy alcohol use); conversely, respondents may over report behaviors that are desirable (e.g., physical activity, nutrition). Cross-sectional design makes causal conclusions impossible. In addition, the sample sizes used to calculate the estimates in this report vary as respondents who indicated, “don’t know,” “not sure,” or “refused” were excluded from most of the calculation of prevalence estimates. BRFSS data collected through 2008 excludes households without landline telephones.*

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